DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES

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Superfund Section
Telephone: (406) 449-4067

November 22, 1991

Harold Chambers
Montana State Library
Capitol Complex
Helena, MT 59620

Dear Mr. Chambers:

Enclosed is the November 1991 Status Report for the BN Livingston Site. Future reports will be provided on a quarterly basis rather than on a monthly basis.

Please call if you have any questions.

Sincerely,

John H. Wadhams

John H. Wadhams
Project Coordinator
BN Livingston Site

Enclosure

JHW/gme

"AN EQUAL OPPORTUNITY EMPLOYER"

NOVEMBER 1991
QUARTERLY STATUS REPORT
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA

Submitted to:

Montana Department of Health and Environmental Sciences
Cogswell Building
Helena, Montana 59620

Submitted by:

Burlington Northern Railroad Co.
9401 Indian Creek Parkway
Overland Park, KS 66201

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Prepared by:

Envirocon, Inc.
101 International Way
Missoula, Montana 59807

Submittal Date:

November 20, 1991

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ENVIROCON, INC.

1.0 INTRODUCTION

Burlington Northern Railroad Co. (BNRR), represented by its contractor Envirocon, Inc., continued field and support activities during August, September, and October 1991 at the Livingston rail yard (LRY), in Livingston, Montana. Envirocon conducted ongoing monitoring operations, site maintenance, construction activities, treatability studies, and investigations. All activities are being conducted in accordance with the Interim Remedial Measures Work Plan (IRMWP), as amended.

This status report is a summary of project activities conducted during August, September, and October 1991.

2.0 CORRESPONDENCE

All August, September, and October correspondence between Envirocon and the Montana Department of Health and Environmental Sciences (MDHES) is summarized on Tables 1.0 and 2.0. Correspondence from Envirocon to the MDHES included submittals of the Draft Remedial Investigation (RI) Report, the draft Indoor Air Quality Investigation Work Plan, the draft Surficial Soil Sampling Work Plan, the Third Quarterly Ambient Air Monitoring Report, bi-weekly progress reports for the pilot-scale hydrocarbon recovery system, and a request to continue operating the Waste Water Treatment Plant (WWTP) soil vapor extraction (SVE) test. Correspondence from the MDHES included approval to continue operating the WWTP SVE test, approval to dispose of drill cuttings collected from below the zone of hydrocarbon contamination during construction of the hydrocarbon recovery observation wells, approval to remove sludge and liquids from the WWTP headworks, and issuance of a Tentative Montana Pollutant Discharge Elimination System (MPDES) Permit.

TABLE 1.0
DOCUMENTS TO MDHES AND EPA

DATE	TO	FROM	BRIEF DESCRIPTION	RESPONSE
06/27/91	MDHES	BNRR/ENV	Draft Amendment 9-2, Field Sampling and Construction Protocols	08/13/91
06/27/91	MDHES	BNRR/ENV	Draft Amendment 10-2, Corporate Sampling and Laboratory QA/QC Plan	08/13/91
07/16/91	MDHES	ENV/BNRR	Summarization of progress with the WWTP vapor extraction test and request to continue operating the test	08/05/91
07/17/91	MDHES	ENV/BNRR	Request for field sampling logs or field diary entries for all samples taken by MDHES so that Envirocon can include MDHES' sampling data in the RI Report	08/27/91
08/01/91	MDHES	ENV/BNRR	Response to MDHES' comments on the Second Quarterly Ambient Air Monitoring Report	N/A
08/08/91	MDHES	ENV/BNRR	Request to install Monitor Well 91-1	08/12/91
08/08/91	MDHES	ENV/BNRR	List of wells to be sampled during the August 1991 annual sampling event	N/A
08/08/91	MDHES	ENV/BNRR	Final Addendum 14-9, Pilot-Scale Hydrocarbon Recovery System	N/A
08/09/91	MDHES	ENV/BNRR	July 1991 Monthly Status Report	N/A
08/14/91	MDHES	ENV/BNRR	Draft Indoor Air Quality Investigation Work Plan	N/R
08/30/91	MDHES	ENV/BNRR	Calculation changes for air risk calculations submitted 08/01/91	N/A

TABLE 1.0 (cont.)
DOCUMENTS TO MDHES AND EPA

DATE	TO	FROM	BRIEF DESCRIPTION	RESPONSE
08/30/91	MDHES	BNRR/ENV	Draft Surficial Soil Sampling Work Plan	N/R
09/11/91	EPA	BNRR/ENV	Description of the by-pass configuration for the pilot-scale hydrocarbon recovery system	10/31/91
09/12/91	MDHES	BNRR/ENV	Revised Master Schedule	N/A
09/12/91	MDHES	BNRR/ENV	Draft Remedial Investigation Report	N/R
09/19/91	MDHES	BNRR/ENV	List of wells to be sampled during the September 1991 monthly ground water sampling round	N/A
09/23/91	MDHES	BNRR/ENV	Notification that Wells RW-1 and RW-4 of the pilot-scale hydrocarbon recovery system will be turned on September 24, 1991	N/A
10/01/91	MDHES	BNRR/ENV	Verification that public notice No. MT-91-08 was posted as required	N/A
10/04/91	MDHES	BNRR/ENV	Request for approval to remove sludge and liquids from the WWTP headworks	10/08/91
10/09/91	MDHES	BNRR/ENV	June 1991 monthly ground water sampling results	N/A
10/09/91	MDHES	BNRR/ENV	July 1991 monthly ground water sampling results	N/A

TABLE 1.0 (cont.)
DOCUMENTS TO MDHES AND EPA

DATE	TO	FROM	BRIEF DESCRIPTION	RESPONSE
10/11/91	MDHES	BNRR/ENV	Third Quarterly Ambient Air Monitoring Report	N/A
10/16/91	MDHES	BNRR/ENV	Discussion of Injection Well I-3 for the pilot-scale hydrocarbon recovery system	N/A
10/14/91	MDHES	BNRR/ENV	Summarization of ENV/BNRR's position on sludge characterization	N/R
10/15/91	MDHES	BNRR/ENV	List of wells to be sampled during the October monthly ground water sampling round	N/A
10/18/91	MDHES	BNRR/ENV	Progress report for the pilot-scale hydrocarbon recovery system	N/A
10/22/91	MDHES	BNRR/ENV	Summarization of issues addressed at the September 18 meeting between ENV and the MDHES	N/A
10/22/91	MDHES	BNRR/ENV	Revised master schedule	N/R
10/24/91	MDHES	BNRR/ENV	Copies of all original laboratory results for data addressed in the RI Report	N/A
10/25/91	MDHES	BNRR/ENV	August 1991 ground water sampling round results	N/A
10/31/91	MDHES	BNRR/ENV	Second progress report for the pilot-scale hydrocarbon recovery system	N/A

Response: xx/xx/xx - Date of response
N/A - Not applicable, no response required
N/R - No response as of the distribution date of this report

TABLE 2.0
DOCUMENTS FROM MDHES AND EPA

DATE	TO	FROM	BRIEF DESCRIPTION	RESPONSE
08/05/91	BNRR/ENV	MDHES	Approval to continue operating the vapor extraction test an additional 25 days	N/A
08/12/91	BNRR/ENV	MDHES	Request for updated master schedule	09/12/91
08/12/91	BNRR/ENV	MDHES	Notification that request to install Monitor Well 91-1 is denied until the MDHES reviews the RI Report	N/A
08/13/91	BNRR/ENV	MDHES	Notification that draft Amendment 9-2 will not be evaluated because a sufficient data program is already addressed in Sections 9.11 and 9.2 of the IRMWP	N/A
08/13/91	BNRR/ENV	MDHES	Notification that draft Amendment 10-2 will not be evaluated because its proposed changes are not necessary	N/A
08/21/21	BNRR/ENV	MDHES	Approval to dispose of drill cuttings collected from below the zone of hydrocarbon contamination during construction of the pilot-scale hydrocarbon recovery observation wells	N/A
08/27/91	BNRR/ENV	MDHES	Field sampling logs requested in Envirocon's July 17, 1991 letter	N/A

TABLE 2.0 (cont.)
DOCUMENTS FROM MDHES AND EPA

DATE	TO	FROM	BRIEF DESCRIPTION	RESPONSE
09/05/91	BNRR/ENV	MDHES	MDHES split results of samples collected at the pilot-scale hydrocarbon recovery observation wells	N/A
09/26/91	BNRR/ENV	MDHES	Tentative MPDES Permit	N/A
10/08/91	BNRR/ENV	MDHES	Approval to begin removing sludge and liquids from WWTP headworks	N/A
10/22/91	BNRR/ENV	MDHES	MDHES split results for soil samples collected from vapor degreaser and LRC manway areas	N/A
10/31/91	BNRR/ENV	EPA	Approval to implement the by-pass system for the multiple-well pilot-scale hydrocarbon recovery system	N/A

Response: xx/xx/xx - Date of response
N/A - Not applicable, no response required
N/R - No response as of the distribution date of this report

3.0 ACTIVITIES SUMMARY

This section summarizes RI activities (including the health risk assessment (HRA) process, the feasibility study, and removal actions) proposed and performed during August, September, and October for the LRY project.

3.1 RI Activities

The investigative information collected in accordance with the IRMWP was interpreted and summarized in the Draft RI Report. The Draft RI Report was submitted to the MDHES on September 12, 1991. The Draft RI Report is currently undergoing a 60-day public comment period, which ends December 1, 1991.

RI and monitoring activities were conducted during August, September and October of 1991. The following is a media-specific summary of these activities.

3.1.1 Ground Water Monitoring

Envirocon conducted the August 1991 annual ground water sampling round on August 6 through 22. Sixty water samples were analyzed as part of this event, including trip blanks; equipment blanks; and primary and duplicate samples collected from monitoring, municipal, and private wells within and around the LRY. The laboratory analytical results and a database data-validation report for these results were submitted to the MDHES on October 25.

On September 25, Envirocon conducted the September 1991 monthly ground water sampling round, which involved the sampling of seven monitoring wells within and around the LRY. The laboratory analytical results for this sampling event will be submitted to the MDHES, along with a database data-validation report, during November.

Envirocon conducted the October 1991 monthly ground water sampling event on October 24, which involved the sampling of four monitoring wells within and around the LRY. The laboratory analytical results for this sampling event will be submitted to the MDHES, along with a database data-validation report, during November.

In September, the Livingston City Water Department notified Envirocon that the B Street Municipal Well is turned off for the winter and will become operational again in April 1992. Therefore, Envirocon will not be conducting scheduled monthly sampling at this well until it becomes operational next spring.

3.1.2 Air Monitoring

The ambient air monitoring program is operated in accordance with IRMWP Addendum 14-4. The Third Quarterly Ambient Air Monitoring Report was submitted to the MDHES on October 11. Fourth quarter ambient air sampling occurred during July, August, and September and involved sampling for particulate matter less than 10 microns (PM10) and total suspended particulates (one sample). An independent audit of the PM10 samplers was performed by Bison Engineering in September. The meteorological station wind-direction sensor was calibrated by Envirocon in October. The Fourth Quarterly Ambient Air Monitoring Report is being prepared for submittal to the MDHES.

3.1.3 Soil Investigation

During October, Envirocon completed the activities discussed in IRMWP Addendum 4-1 by performing the Yellowstone River gravel investigation and by sampling the beneath the WWTP grit chambers floor. The river gravel investigation involved excavating 13 test pits and collecting four river gravel samples. No visual evidence of contamination was encountered during excavation and no volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), or total petroleum hydrocarbons (TPHs) were detected in the four river gravel samples.

Two soil samples were collected beneath the grit chambers floor, pursuant to IRMWP Addendum 4-1. No VOCs, SVOCs, or TPHs were detected in the sample collected from beneath the south grit chamber and total priority metal detections were within background concentrations, which are presented in Section 3.0 of the RI Report.

The north grit chamber sample results have yet to be received from the laboratory.

3.1.4 Health Risk Assessment

The HRA will be conducted by the MDHES as part of the RI. Camp Dresser and Mckee has been selected by the MDHES to conduct the HRA. The MDHES has been involved in contract negotiations since June 1991.

As part of the HRA, Envirocon has submitted work plans to conduct exposure assessments. Envirocon submitted a draft Indoor Air Quality Work Plan to MDHES for review on August 14. Envirocon also submitted a draft Surficial Soil Sampling Work Plan to MDHES for review on August 30.

The computerized database and validation of the database data for the LRY have been completed. The data are ready for evaluation by MDHES' HRA contractor.

3.2 Feasibility Study

Envirocon has begun preparing the preliminary screening of remedial alternatives report. The draft report will be submitted to the MDHES by December 15, 1991.

Treatability studies have been conducted concurrently with the RI. The following is a media-specific summary of the treatability studies.

3.2.1 Hydrocarbon Recovery Treatability Studies

Construction of the multiple-well pilot-scale hydrocarbon recovery system, proposed in IRMWP Addendum 14-9, was completed in September, and the system began operating on September 24. The recovery-trench hydrocarbon recovery system, also proposed in IRMWP Addendum 14-9, began operating on October 25.

Product recovery began on September 29, and as of October 30, 1,012 gallons of product have been recovered from five of the six recovery wells. The southern line recovery wells have produced the greatest volumes of product due to their being located in the thickest part of the hydrocarbon plume.

The multiple-well system is currently operating at less than capacity due to biofouling of the injection wells. Recovery Well RW-5 was turned off in order to accommodate the lower productivity of the injection wells, which is due to increased growth of iron-fixing bacteria in these wells and the surrounding

alluvium. Envirocon will be installing a chlorination system to reduce the bacterial growth, thus allowing RW-5 to be turned back on and the multiple-well system to operate optimally.

No product has been recovered from the trench recovery system. Product in the recovery-trench sump has not increased in thickness since the system began operating. The ground water pumping rate will be increased in order to create a steeper hydraulic gradient and induce product flow towards the sump. Under the current pumping rate the ground water being treated contains dissolved diesel-fuel constituents. Therefore, an increase in the pumping rate will cause the carbon used for treating the water to be consumed at a faster rate.

3.2.2 Soil Treatability Studies

The SVE test at the WWTP sump, discussed in IRMWP Addendum 14-5, began operating on June 12 and operated intermittently until August 30. Approval to extend the test was given by MDHES so that humidity controls and the best system configuration could be designed. The SVE test demonstrated that VOCs can be successfully removed from the soil beneath the WWTP sump and that SVE emissions can be effectively controlled. Results for the SVE test will be summarized in the source control work plan, which will be submitted to the MDHES during November.

In addition to conducting the SVE test at the WWTP sump, Envirocon conducted a three-day test during September at the manway adjacent to the WWTP lift station. This SVE test also demonstrated that VOCs can be successfully removed from the soil at the LRY. Results for the three-day test are also presented in the source control work plan.

During August, Envirocon submitted to the MDHES a Surficial Soil Sampling Work Plan. Surficial soil sampling will be performed at the LRY in conjunction with the HRA. The sampling plan is being reviewed by the MDHES and the HRA contractor.

During September, Envirocon removed the visible asbestos material from the surface of the cinder pile. This removal action completes the activities discussed in IRMWP Addendum 4-2.

3.3 EPA Listing Site Investigation

EPA's contractor, Ecology and Environment (E & E), completed on-site data acquisition activities during April 1991. The activities were conducted to collect data that will be used for EPA's Listing Site Investigation ranking model. The formal listing process is expected to be completed in 1992.

3.4 Sludge Program

Envirocon continued to monitor the sludge isolation work zones weekly as described in previous reports. During October, Envirocon removed the sludge and decontaminated the oil sump at the WWTP grit chambers.

3.5 Waste Water Program

Waste water is being generated during a number of activities, including ground water sampling, well construction, equipment decontamination, and sludge isolation cell maintenance. Envirocon completed the construction of a waste water containment compound, which contains three 12,000-gallon above-ground tanks for storing waste water. Waste water is currently being transferred from barrels into the waste water containment compound.

Envirocon anticipates treating all stored waste water during the last quarter of 1991 in accordance with MPDES Permit No. MT-0029670.

4.0 SCHEDULED ACTIVITIES FOR NOVEMBER AND DECEMBER 1991 AND JANUARY 1992

Envirocon anticipates conducting a number of field and support activities during the months of November and December 1991 and January 1992. The following is a list of activities scheduled:

- Conduct November 1991 quarterly, December 1991 monthly, and January 1992 monthly ground water sampling.
- Continue ambient air monitoring.
- Continue operating the pilot-scale hydrocarbon recovery systems.
- Submit a removal-action work plan to the MDHES addressing source control measures at the primary ground water VOC sources.
- Submit the preliminary screening of remedial alternatives to the MDHES
- Treat stored waste water in compliance with Envirocon's MPDES permit.

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Solid and Hazardous Waste Bureau
Department of Health
and Environmental Sciences
Cogswell Building
Helena, MT 59620

Attention: Mr. John Wadhams

Subject: Ambient Air Monitoring Program - Livingston Rail Yard

Dear John:

Please find enclosed 17 copies of the 1991 Annual Ambient Air Monitoring Report for the Livingston Rail Yard. The report includes the fourth quarter (October, November, and December) results for 1991 and a discussion and interpretation of data collected to-date.

The ambient PM10 data documents that the Livingston Rail Yard does not increase particulates downwind of the site. The PM10 data indicates that on average, the upwind PM10 concentrations are greater upwind than downwind. Based upon this data, Burlington Northern requests approval to discontinue operating the ambient monitoring system. Work-zone and employee-exposure monitoring, in accordance with the Interim Remedial Measures Work Plan, as amended, will continue during remedial activities.

This letter summarizes information from the report that is relevant to this request to cease operating the ambient air monitoring system.

INTRODUCTION

The monitoring network was established in November 1990 near the Livingston Rail Yard to ascertain both the background air quality concentrations and the air quality values downwind of a number of cleanup activities.

PM10 data has been collected upwind and downwind of the rail yard site for 14 months. TSP data was also collected downwind of the site through July 1991. Throughout the ambient monitoring program, a meteorologic station has also been operated in Livingston by Envirocon, Inc. Data collected in the monitoring network has been presented to the MDHES in quarterly reports. All PM10 and TSP data collected to-date has been compiled in the attached 1991 Annual Report.

Comparison of PM10 and TSP Data to Ambient Standards

Available PM10 and TSP data from the ambient network has been compared to ambient standards, as shown on Table 1.0. This comparison shows that no ambient concentration of particulates at either Livingston site has come close to exceeding the ambient standards.

Table 1.0
PM10 and TSP Results Versus Ambient Standards
1990-1991

	Standard	Upwind Site	Downwind Site
PM10 Max. Mean^	50*	19	17
PM10 Peak ^	150**	56	34
TSP Mean	75*	-	34
TSP Peak	260**	-	67

Units: $\mu g/m^3$
* Annual mean.
** Not to be exceeded more than once per year.
^ Values from the 14-month operating period.

Statistical Analysis of Ambient Data

A summary of the PM10 data from the monitoring sites is presented on Table 2.0.

Table 2.0
PM10 Summary Statistics
1990-1991

	Upwind	Downwind	Difference
Mean	18.05	15.46	-1.92*
Std. Dev.	8.54	6.14	5.90**
No. of Samples	56	52	49

* Mean of paired differences.
** Standard deviation of paired differences.

Two statistical tests, a "paired t" test and an "unpaired t" test, have been performed using the upwind and downwind PM10 data. The tests are used to assess whether there is enough evidence to reject a "null hypothesis." In both cases, the null hypothesis is that the average pollutant concentrations at both sites are equivalent.

The unpaired-t tests treat all the sample values as independent and random. The results of the unpaired-difference test show that the t value is less than the "critical" t value. Because the unpaired t falls within a 95% two-tailed confidence interval, it is concluded that not enough evidence exists to reject the null hypothesis based on this test (see Table 3.0).

Table 3.0
Statistical Analysis
Downwind Versus Upwind PM10 Concentrations

Test	Critical t	t
Paired Difference	1.96	-2.27
Unpaired Difference	1.96	-1.80

No special significance should be read into the fact that the two statistical tests yield different results. The two tests rely upon different assumptions and thus may yield different answers. What is of interest in this analysis is the underlying question as to whether or not the downwind site has higher values than another site which is upwind of the rail yard. Both analyses fail to support any conclusion that the rail yard causes ambient concentrations above what might otherwise occur in the area. In fact, the statistical conclusion is that either the rail yard activities have no impact on ambient concentrations or that the rail yard itself is a cleaner area than the other site.

The paired difference determines the t value associated with the differences between the downwind and upwind concentrations during individual sampling periods. The absolute value of the paired t is greater than the critical t for the number of available sample days. Therefore, there is enough evidence under this test to reject the null hypothesis that the upwind and downwind results are equal. However, the fact that the t value is negative indicates the upwind ambient concentration is, on the average, greater than the downwind concentration.

Data Quality

The network was designed and is being operated in accordance with Section 14.4 of the Interim Remedial Measures Work Plan, as specified by the MDHES. Every effort was made to obtain accurate and representative data and to comply with procedures set forth in the Quality Assurance Handbook for Air Pollution Measurement Systems; Volume II, Ambient Air Specific Methods (EPA- 600/4-77-027a).

Overall data recovery for the facility for 1991 was 78% at the upwind site and 72% at the downwind site.

Impacts on Other Livingston Sites

Results from PM10 monitoring at an unrelated site in Livingston were compared for 1990 and 1991. The PM10 monitor is located in a residential area south of the rail yard site. Average monthly concentrations for the months of June through December in 1990 and 1991 were compared. Again, both the paired and unpaired t tests were applied. As the results on Table 4.0 and 4.1 show, neither calculated t value exceeded the "critical t." Therefore, the null hypothesis that there was no change in ambient concentration at the monitoring site cannot be rejected.

Table 4.0
1990 Versus 1991 PM10 Concentrations

	1990 Average	1991 Average	Difference
June	16	16	3
July	21	19	-2
August	20	21	1
September	20	23	-3
October	13	22	1
November	13	13	2
December	9	11	2
Average	17.6	19.1	1.6
Std. Dev.	5.6	3.9	3.2

Table 4.1

Test	Critical t	t
Paired Difference	2.45	1.30
Unpaired Difference	2.45	10.61

Conclusions

PM10 data has been collected upwind and downwind of the Livingston Rail Yard for 14 consecutive months. Although there have been some gaps in the collection schedule, overall data recovery for the period has been more than 70% at both sites.

Comparison of ambient PM10 concentrations upwind and downwind of the Livingston Rail Yard has shown that activities at the site have not led to increases in particulates downwind. In fact, the average concentration of 14 months has shown that upwind concentrations are, on the average, greater than downwind concentrations.

Of the 108 PM10 samples collected upwind and downwind of the site, none have exceeded 40% of the peak ambient standard or the annual mean. Collection of additional samples cannot be expected to yield any data that exceeds the standards.

Ambient PM10 data from the Livingston area shows very little overall change in concentrations between 1990 and 1991. This is yet another indication that activities at the rail yard are not causing an increase in ambient concentrations of particulates in the Livingston area.

If you have any questions or comments, please contact me at your convenience.

Sincerely,

ENVIROCON, INC.

Kris Kok
Project Manager

KK/pm
cc: Mel Burda
Steve Pilcher
Dennis Iverson
Joe Michaletz
Envirocon, Missoula